# Cow Position Multi-Class Classification Problem

Introduction:

Motion analysis is used in various industries and disciplines. Motion analysis can be broken down into many components like object detection, object localisation, segmentation, tracking, detection, pose estimation. Object detection is about identifying the object itself, and motion detection is the process where by an image containing a moving object is subject to image processing techniques that enable the tracking of motion through either differential methods or background segmentation in which moving aspects in the images are extracted by discarding the motionless parts of the images to isolate the moving part

Pose estimation is the process where the position and orientation of the vital body parts and joints of a body are derived from an image or sequence of images.

## Problem statement

Classify cow position, do behaviour analysis and motion analysis using various machine learn models to find the best classification model. This is a multi-class classification problem.

## Dataset

Dataset is provided for assignment and it contains labelled data and with 9 features from sensors and videos. The dataset has 12263524 records and 12 columns with 9 target classes

## Approach

* Understand the problem
* Understand the dataset
* Clean the dataset
* Handle data imbalance
* Do feature selection
* Experiment with various machine learning models
* Analyse the results
* Next steps

## Results

|  |  |  |
| --- | --- | --- |
| Model | Accuracy | Error |
| Logistic Regression | 28.15% | 71.85% |
| Linear SVC | 16.68% | 83.32% |
| rbf SVM classifier | 71.08% | 28.92% |
| DecisionTree | 62.94% | 37.06% |
| Random Forest | 80.75% | 19.25% |

## Next steps

* Do more feature selection – note feature selection is not done now
* Reduce the number of class and see the accuracy
* Convert the class into features and see the results
* For data imbalance try oversampling and see
* Try more models like gradient boosting and LSTM models